

Regulation
No. 1110-1-4

31 March 1994

Engineering and Design
METRIC MEASUREMENTS IN USACE PUBLICATION MEDIA

1. Purpose.

This regulation establishes policy and requirements for incorporating metric measurements into engineering and design publication media.

2. Applicability.

This regulation applies to all HQUSACE/OCE elements, major subordinate commands, district commands and technical centers, laboratories, and field operating activities having military construction, hazardous, toxic, and radioactive waste (HTRW), and/or civil works responsibilities.

3. References.

a. Public Law (PL) 94-168, The Metric Conversion Act of 1975, as amended by PL 100-418, the Omnibus Trade and Competitiveness Act of 1988.

b. Executive Order (EO) 12770 dated 25 July 1991, Metric Usage in Federal Government Programs.

c. American Society for Testing and Materials (ASTM) E 380-92, Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System).

d. ASTM E 621-84 (Re-approved 1991), Standard Practice for Use of Metric (SI) Units in Building Design and Construction.

e. Architectural and Engineering Instructions (AEI), Design Criteria, issued by HQUSACE (CEMP-E). Copies of this document are available in electronic media on the DoD-sponsored Construction Criteria Base (CCB) distributed by the National Institute of Building Sciences, 1201 L Street, N.W., Suite 400, Washington, DC 20005.

4. Definitions:

a. **Hard Metric.** This term refers both to products that are manufactured to industry-established metric modules and standards and to metric measurements that are mathematically converted from corresponding inch-pound (IP) values and logically rounded to hard metric whole numbers, e.g., 600 mm by 1200 mm (approximately 2 feet by 4 feet) as an established metric module for acoustical ceiling tiles and 650°C as the rounded SI value for 1200°F. Numerical rounding will be in accordance with references 3.c.

b. **Soft Metric.** This term refers to products and measurements that conform to IP modules, standards, or other controlling factors and are expressed in metric values that are exact mathematical conversions of corresponding IP values. Converted measurements will be expressed to the minimum number of significant digits that will maintain the required accuracy in accordance with reference 3.c.

c. **Neutral (Designations).** This term refers to identifiers that have no expressed relation to either metric or IP values, e.g., American Wire Gage (AWG) which designates thickness but in itself is neither metric or IP.

5. Policy.

a. In accordance with reference 3.a. and 3.b., metric units of measure shall be incorporated into all new or revised publication media used to disseminate engineering and design criteria, e.g., technical letters, circulars, regulations, manuals, guide specifications, studies, reports, and other guidance documents.

b. The International System of Units (SI) will be used for implementation of this policy and will

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be applied in accordance with the requirements of this regulation, the SI standard practice established by references 3.c. and 3.d., and for Military Programs only, the additional modifications and/or clarifications established by reference 3.e.

c. Unless directed otherwise, Military Programs and HTRW publication media will be developed using dual SI and IP units for measurements governed by critical IP values, e.g., values required to comply with applicable codes and standards. When IP values are critical, SI measurements will be soft metric conversions of corresponding IP measurements or conservatively rounded conversions of required maximum or minimum IP measurements. SI measurements only will be used in Military Programs and HTRW publication media not governed by critical IP values.

d. All Civil Works publication media will be developed with dual SI and IP units.

e. For all applications where dual units will be used, the following general rules apply:

(1) For text, SI designations will occur first followed by the corresponding IP designations in parentheses, e.g., 14 m² (150 SF).

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(2) For tables, graphs, and charts, corresponding SI and IP designations should be presented in a combined format when the information can be presented in a clear and concise manner. Otherwise, separate SI and IP tables, graphs, and charts will be used.

(3) For formulas containing numerical constants that are unit dependent, the preferred format is to use a symbol for the constant. The appropriate SI and IP values for the constant should be given immediately following the formula along with the appropriate SI and IP units for each symbol in the formula.

f. SI designations will be hard metric when there is no conflict with codes and standards and available products are economically feasible and will effectively interface with non-metric construction components.

g. Neutral measurements or designations will remain "as is" in metric publication media.



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